



# ORIENT

## Photo coupler

### Product Data Sheet

Part Number: OR-6XXA

Customer: \_\_\_\_\_

Date: \_\_\_\_\_

**SHENZHEN ORIENT COMPONENTS CO., LTD**

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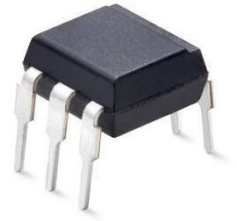
[www.orient-opto.com](http://www.orient-opto.com)

**1. Features**

- (1) Normally open signal pole signal throw relay
- (2) Low operating current
- (3) 60 to 600V output withstand voltage
- (4) Low on resistance
- (5) Wide operating temperature range of -40°C to 85°C
- (6) Safety approval

UL approved(No.E323844)  
 VDE approved(No.40029733)  
 CQC approved (No.CQC19001231480 )

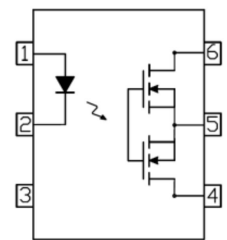
- (7) In compliance with RoHS, REACH standards
- (8) MSL Level 1



**2. Description**

The OR-606A, OR-625A, OR-640A and OR-660A are solid state relays containing an AlGaAs infrared LEDs on the light emitting side (input side) optically coupled to a high voltage output detector circuit. The detector consists of a photovoltaic diode array and MOSFETs on the output side. They can enable AC/DC and DC only output connections. The single channel configuration is equivalent to 1 form A EMR. They are packaged in 6 pin DIP and available in surface mount SMD option.

Schematic



Pin Configuration

- 1, LED Anode
- 2, LED Cathode
- 4, 6 MOSFET Drain
- 5, MOSFET Source

**3. Application Range**

- Exchange equipment
- Industrial controls
- Measurement equipment
- Security
- FA/OA equipment

**4. Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Rating				Unit	
		OR-606A	OR-625A	OR-640A	OR-660A		
Input	Forward Current	I <sub>F</sub>	50				mA
	Reverse Voltage	V <sub>R</sub>	5				V
	Peak Forward Current*1	I <sub>FP</sub>	1				A
	Power Dissipation	P <sub>in</sub>	75				mW
Output	Break Down Voltage	V <sub>L</sub>	60	250	400	600	V
	Continuous Load Current	I <sub>L</sub>	550	150	120	50	mA
	Pulse Load Current*2	I <sub>LPeak</sub>	1.2	0.5	0.3	0.15	A
	Power Dissipation	P <sub>out</sub>	500				mW
Total Power Dissipation	P <sub>T</sub>	550				mW	
Isolation Voltage*3	V <sub>iso</sub>	5000				V <sub>rms</sub>	
Storage Temperature	T <sub>STG</sub>	-40 to 125				°C	
Operating Temperature	T <sub>OPR</sub>	-40 to 85				°C	
Soldering Temperature*4	T <sub>SOL</sub>	260				°C	

Notes:

- \*1. f=100Hz, Duty Cycle = 0.1%
- \*2. A connection: 100ms (1 shot), V<sub>I</sub> = DC
- \*3. AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1,2, 3 are shorted together, and pins 4, 5, 6 are shorted together.
- \*4. For 10 seconds

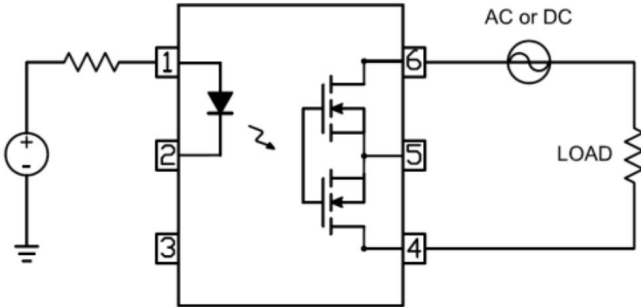
5. Electrical Optical Characteristics at Ta=25°C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition	
Input	Forward Voltage	V <sub>F</sub>	---	1.18	1.5	V	I <sub>F</sub> = 10mA	
	Reverse Current	I <sub>R</sub>	---	---	1	μA	V <sub>R</sub> = 5V	
Output	Off State leakage Current	I <sub>leak</sub>	---	---	1	μA	I <sub>F</sub> = 0mA, V <sub>L</sub> = Max.	
	On Resistance	OR-606A	Rd(ON) A	---	0.75	2.5	Ω	I <sub>F</sub> = 5mA, I <sub>L</sub> = Max, t = 1s
		OR-625A		---	6.5	15		
		OR-640A		---	20	30		
		OR-660A		---	42	70		
	On Resistance	OR-606A	Rd(ON) B	---	0.4	1	Ω	I <sub>F</sub> = 5mA, I <sub>L</sub> = Max, t = 1s
		OR-625A		---	3.4	5		
		OR-640A		---	15.2	20		
		OR-660A		---	28	50		
	On Resistance	OR-606A	Rd(ON) C	---	0.2	0.5	Ω	I <sub>F</sub> = 5mA, I <sub>L</sub> = Max, t = 1s
		OR-625A		---	1.7	3		
		OR-640A		---	7.6	15		
		OR-660A		---	14	30		
	Output Capacitance	OR-606A	C(out)	---	85	---	pF	V <sub>L</sub> = 0V, f = 1MHz
OR-625A		---		60	---			
OR-640A		---		45	---			
OR-660A		---		30	---			
Transfer Characteristics	LED turn on Current	OR-606A	IF(on)	---	1.38	3	mA	I <sub>L</sub> = Max.
		OR-625A		---	1.28	3		
		OR-640A		---	1.36	3		
		OR-660A		---	1.32	3		
	LED turn off Current	OR-606A	IF(off)	0.4	1.22	---	mA	I <sub>L</sub> = Max.
		OR-625A		0.4	1.12	---		
		OR-640A		0.4	1.38	---		
		OR-660A		0.4	1.2	---		
	Turn On Time	OR-606A	Ton	---	1.3	3	ms	I <sub>F</sub> = 10mA, I <sub>L</sub> = Max, R <sub>L</sub> = 200Ω
		OR-625A		---	1	3		
		OR-640A		---	0.35	3		
		OR-660A		---	1	3		
	Turn Off Time	OR-606A	Toff	---	0.1	0.5	ms	I <sub>F</sub> = 10mA, I <sub>L</sub> = Max, R <sub>L</sub> = 200Ω
		OR-625A		---	0.1	0.5		
OR-640A		---		0.1	0.5			
OR-660A		---		0.1	0.5			
Isolation Resistance		R <sub>I-O</sub>	5×10 <sup>10</sup>	1×10 <sup>12</sup>	---	Ω	V <sub>I-O</sub> = 500V DC	
Isolation Capacitance		C <sub>I-O</sub>	---	1.5	---	pF	V = 0V, f = 1MHz	

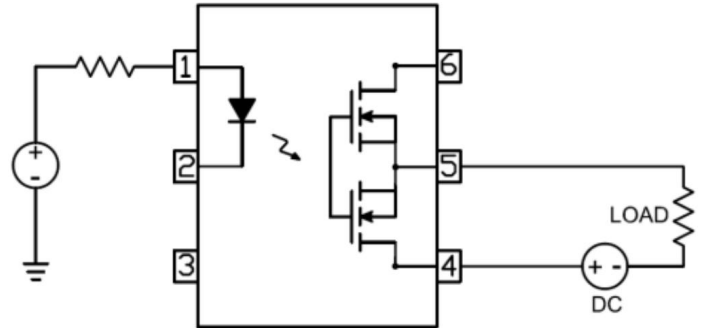
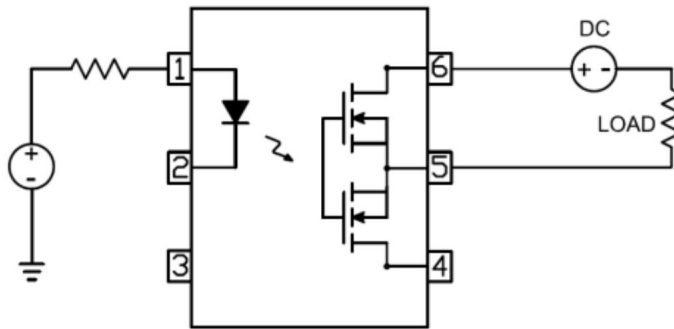
Note:

\* On resistance test

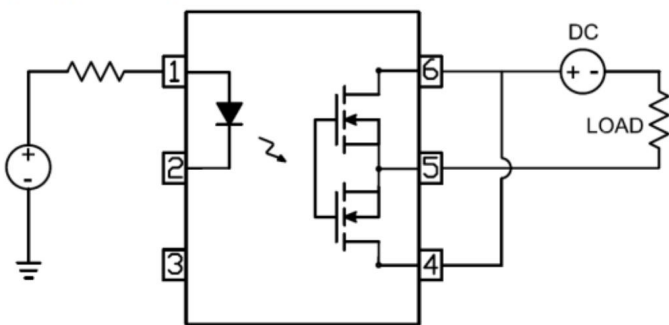
Connection A



Connection B



Connection C





## 6. Order Information

### Part Number

# OR-6XXAU-Y-Z

### Note

6XXA = Part Number (XX for 06, 25, 40 or 60)

U = Lead form option (S, M or none)

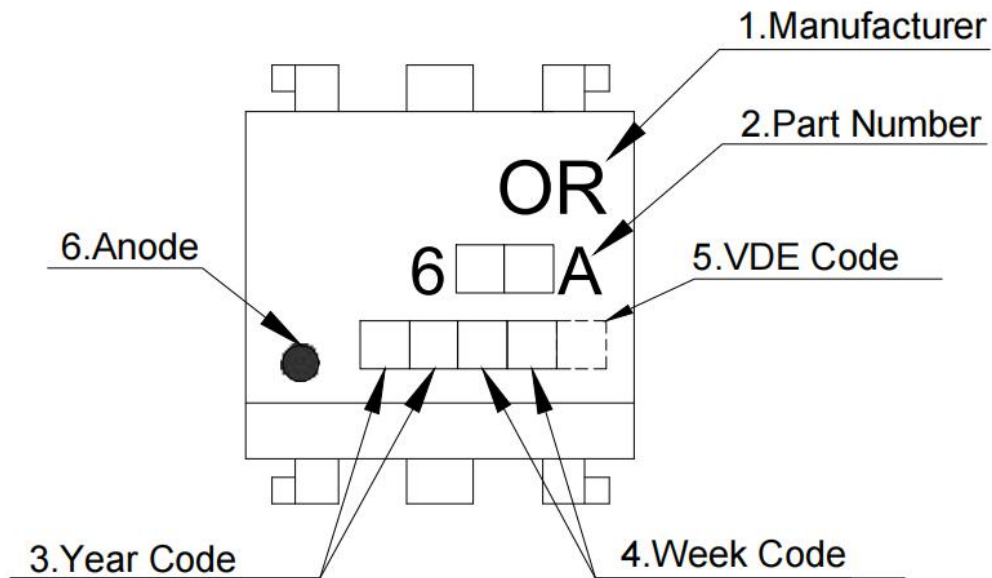
Y = Tape and reel option ( TA,TA1 or none).

Z = 'V' code for VDE safety (This options is not necessary).

\* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-6	66 units per tube
M	Wide lead bend (0.4 inch spacing)	66 units per tube
S(TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S(TA1)	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

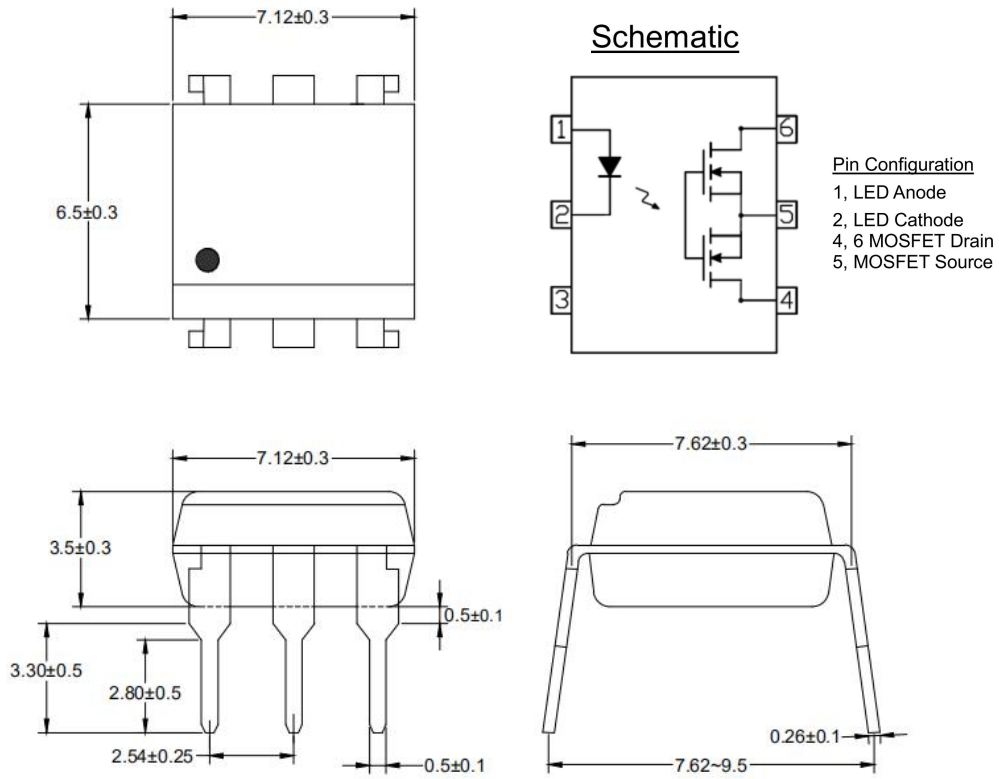
## 7. Naming Rule



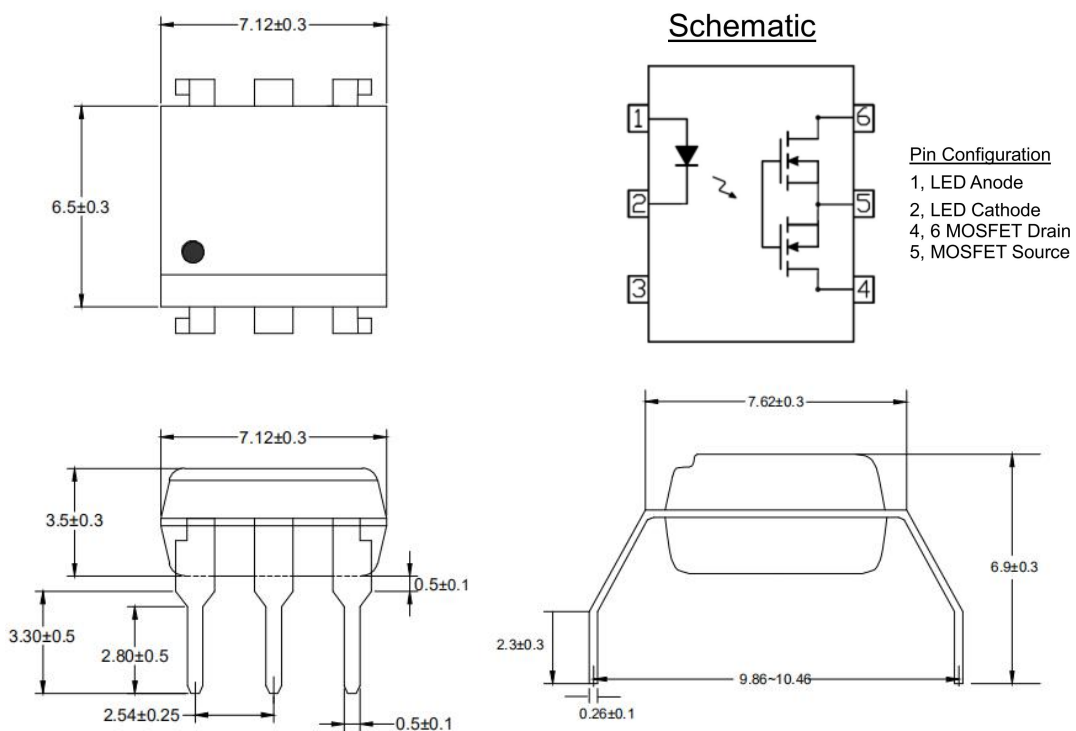
1. Manufacturer : ORIENT.
2. Part Number : 606A, 625A, 640A or 660A.
3. Year Code   : '21' means '2021' and so on.
4. Week Code  : 01 means the first week, 02 means the second week and so on.
5. VDE Code  . (Optional)
6. Anode.

### 8. Package Dimension

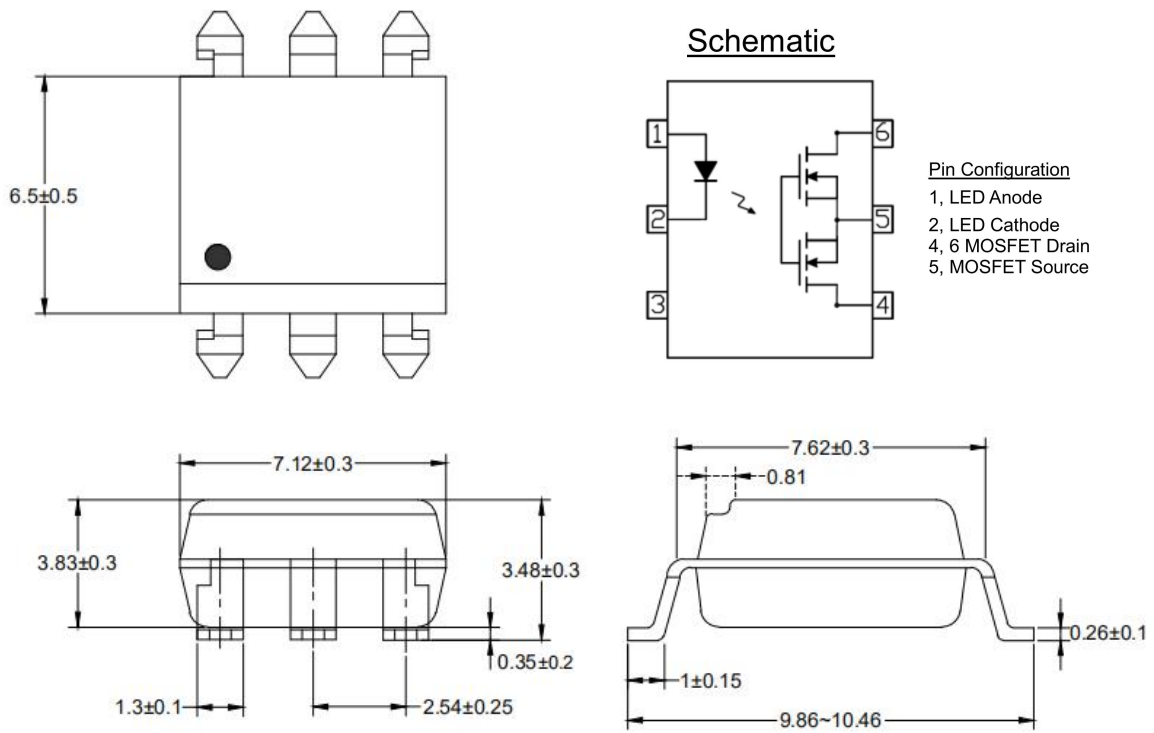
#### (1).6XXA



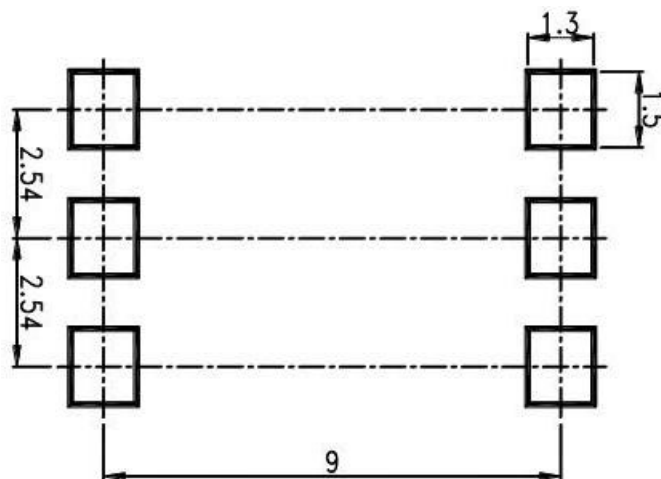
#### (2).6XXA M



(3).6XXA S



**9. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)**

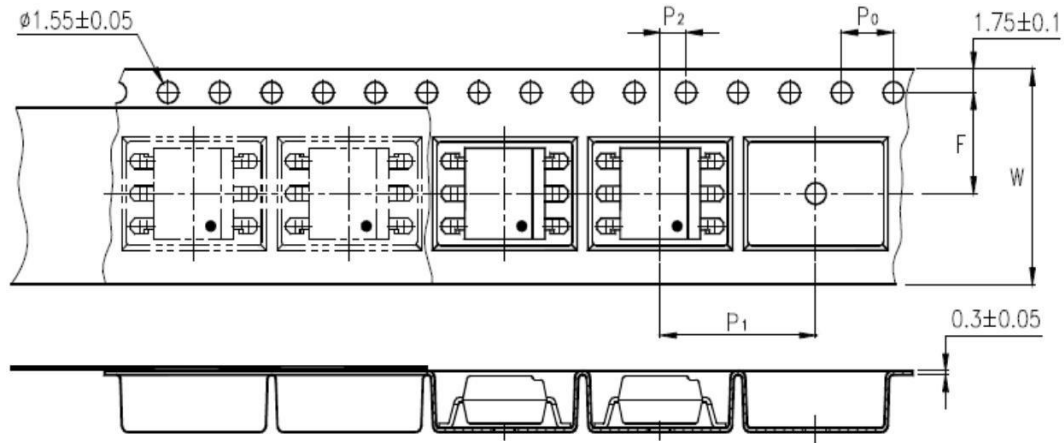


Unit: mm

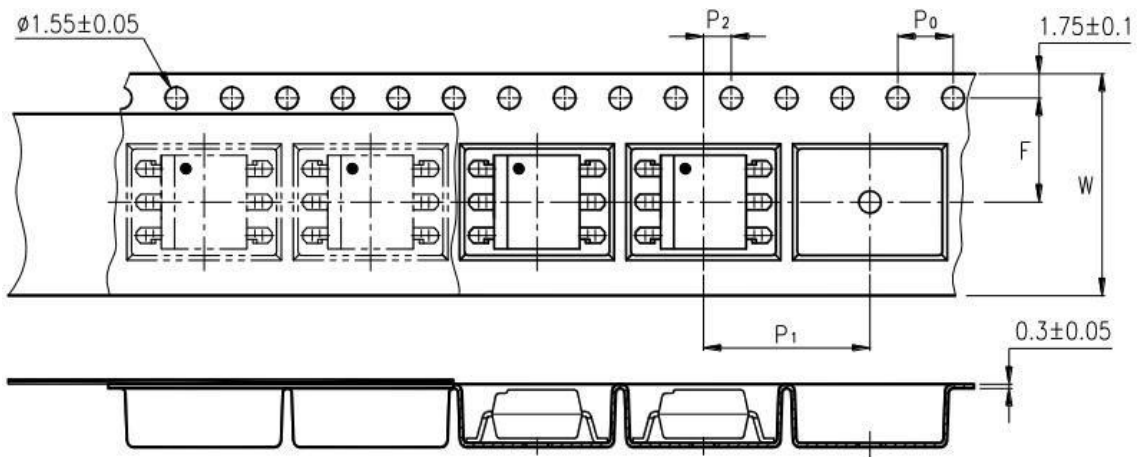


10. Taping Dimensions

(1) .OR-6XXAS-TA



(2) OR-6XXAS-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P <sub>0</sub>	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P <sub>2</sub>	2±0.1 (0.079)
Distance of compartment to compartment	P <sub>1</sub>	12±0.1 (0.472)

Package Type	TA/TA1
Quantities(pcs)	1000

## 11. Package Dimension

### (1) package dimension


DIP/M type

Packing Information	
Packing type	Tube
Qty per Tube	66pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	3,300pcs
The Amount per Outer Box	33,000pcs


SOP type


Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	2,000pcs
Max qty per large box	20,000pcs

### (2)Packing Label Sample



Material Code : 120PCXXXXXX  
P/N : OR-XXXXXX  
Lot No. : XXXXXX-XXXX-TX-X  
D/C : XXXX  
Qty : XXXX PCS





内箱码

外箱码

“XXXXXXXXXXXXXXXX” (一体机序列码)  
**Made in China**

**Note:**

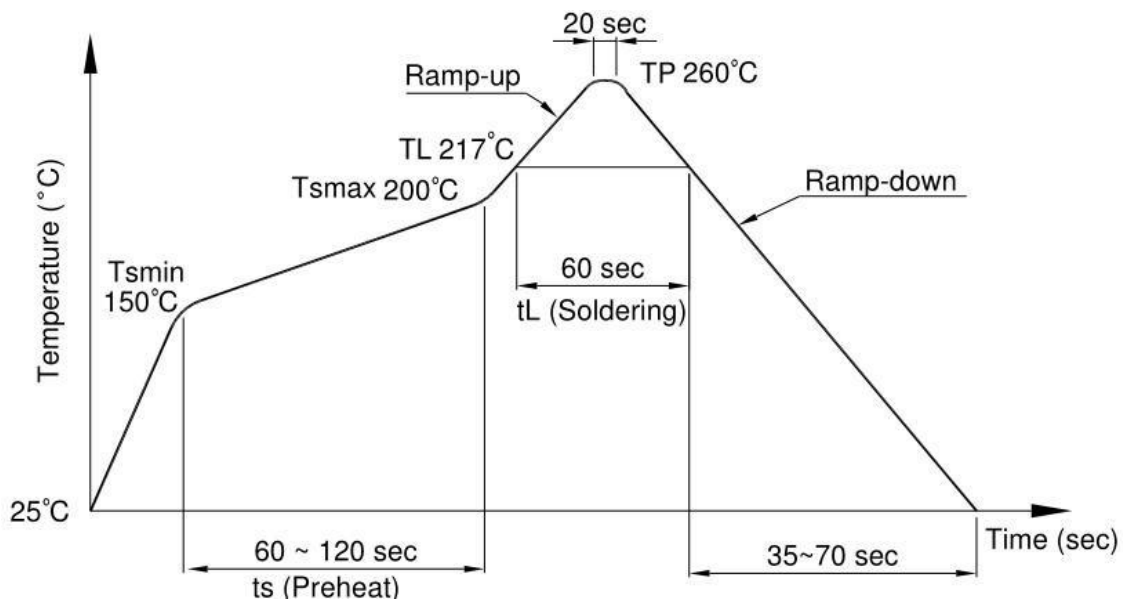
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

## 12. Temperature Profile Of Soldering

(1).IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

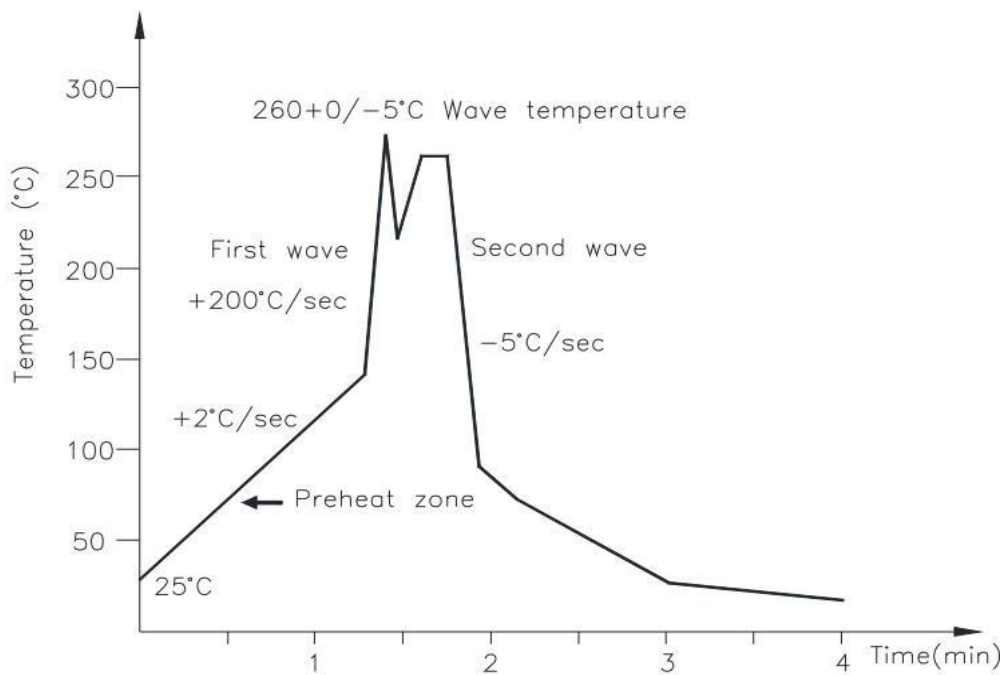
Profile item	Conditions
Preheat - Temperature Min (T Smin ) - Temperature Max (T Smax ) - Time (min to max) (ts)	150°C 200°C 90±30 sec
Soldering zone - Temperature (TL ) - Time (t L )	217°C 60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature	3~6°C / sec
Reflow times	≤3



**(3) .Wave soldering (JEDEC22A111 compliant)**

One time soldering is recommended within the condition of temperature.

Temperature	260+0/-5°C
Time	10 sec
Preheat temperature	5 to 140°C
Preheat time	30 to 80 sec



**(3).Hand soldering by soldering iron**

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature	380+0/-5°C
Time	3 sec max

### 13. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Figure 1-1. Load current vs Ambient temperature

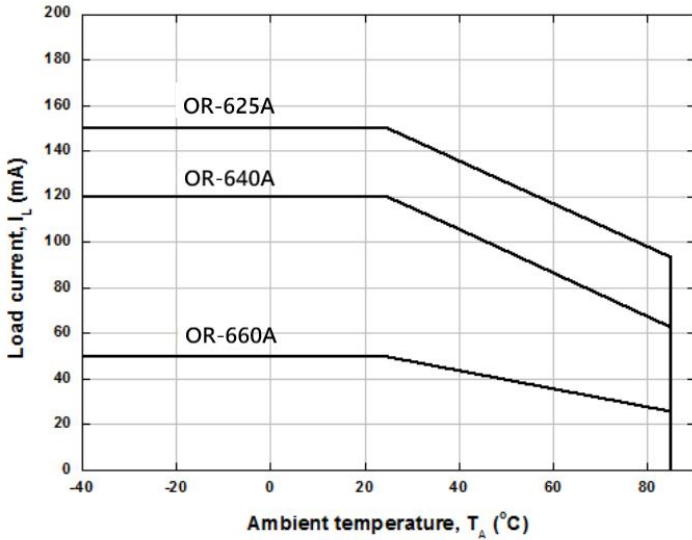


Figure 1-2. Load current vs Ambient temperature

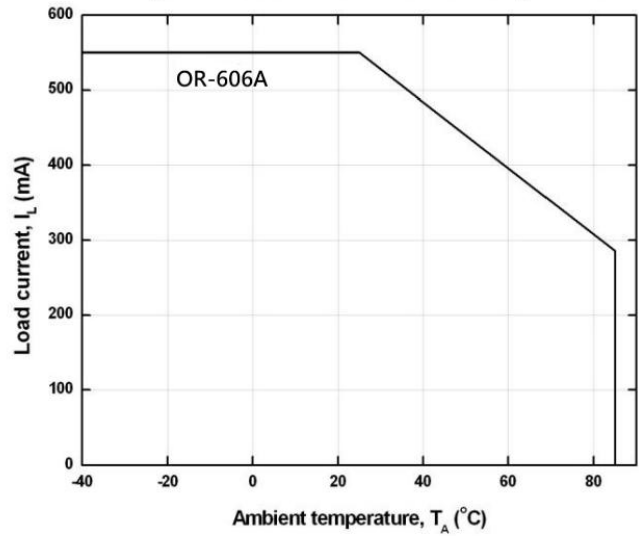


Figure 2-1. On Resistance vs Ambient Temperature

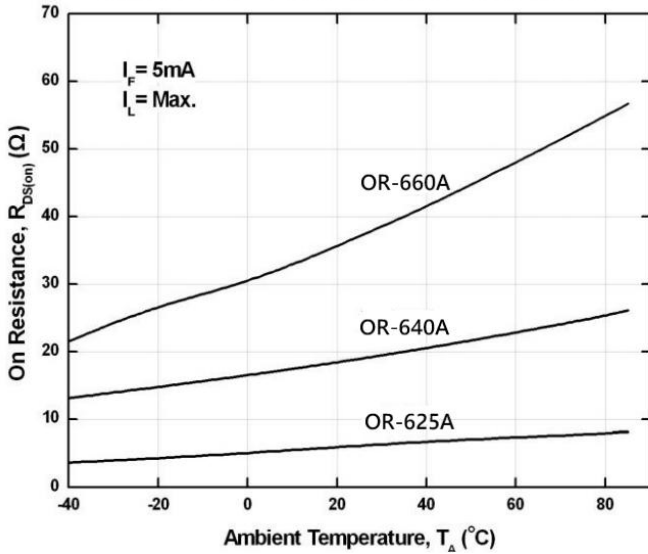


Figure 2-2. On Resistance vs Ambient Temperature

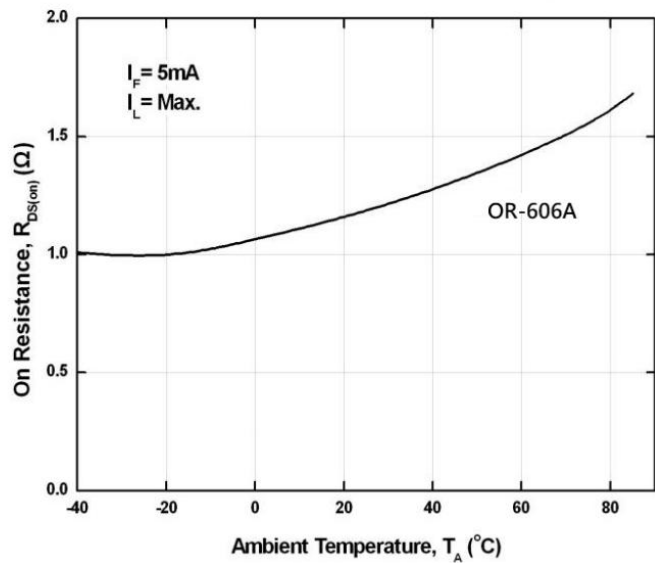


Figure 3. Switching Time vs Ambient Temperature

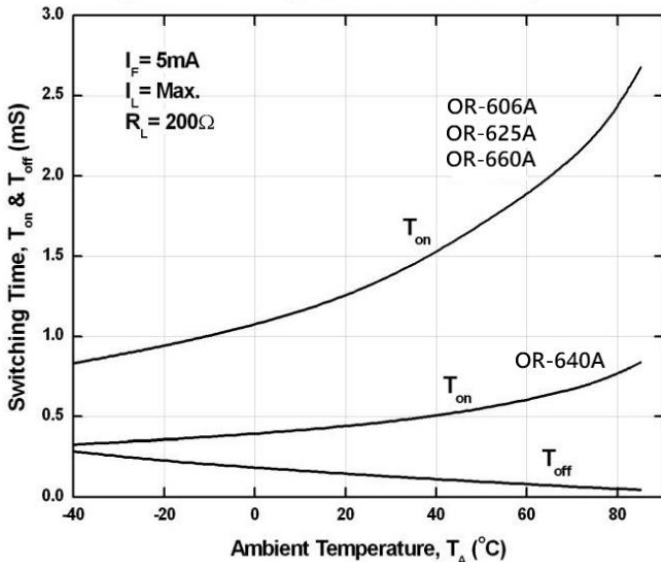


Figure 4. Turn On Time vs LED Forward Current

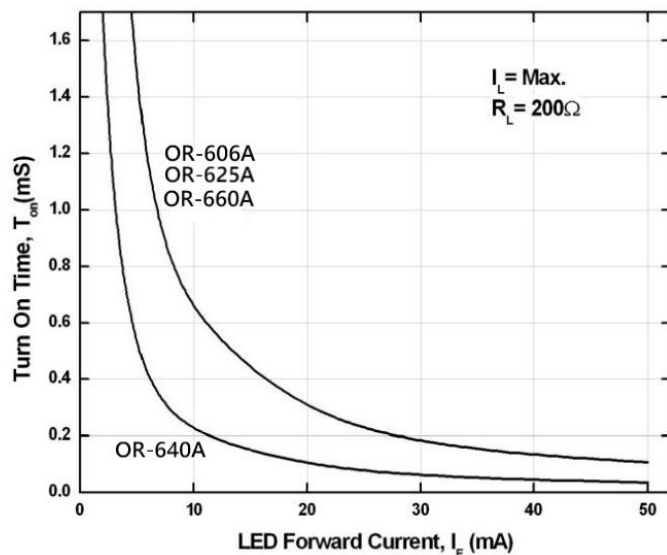


Figure 5. Turn Off Time vs LED Forward Current

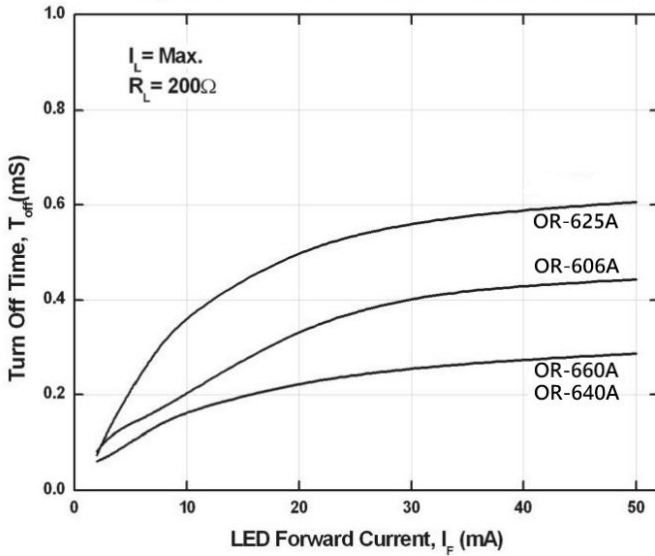


Figure 6. LED Operate on Current vs Ambient Temperature

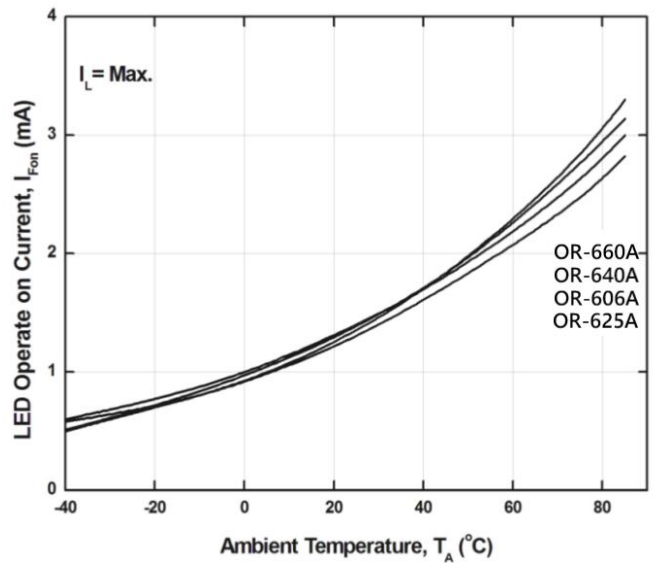


Figure 7. LED Turn off Current vs Ambient Temperature

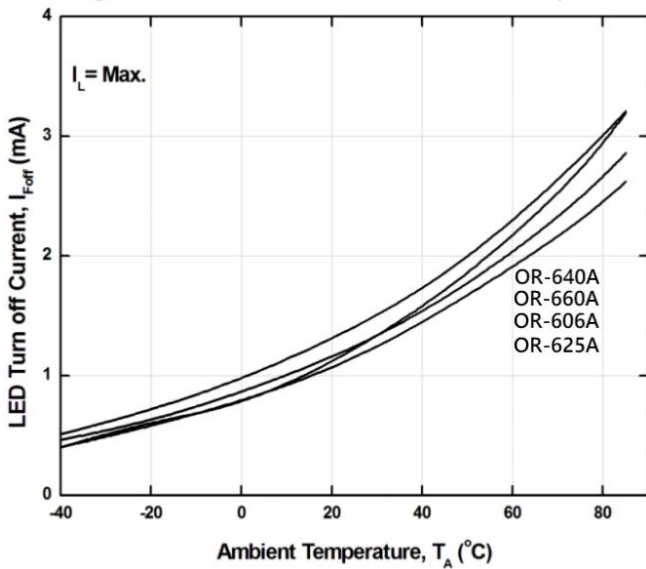


Figure 8. LED Dropout Voltage vs Ambient Temperature

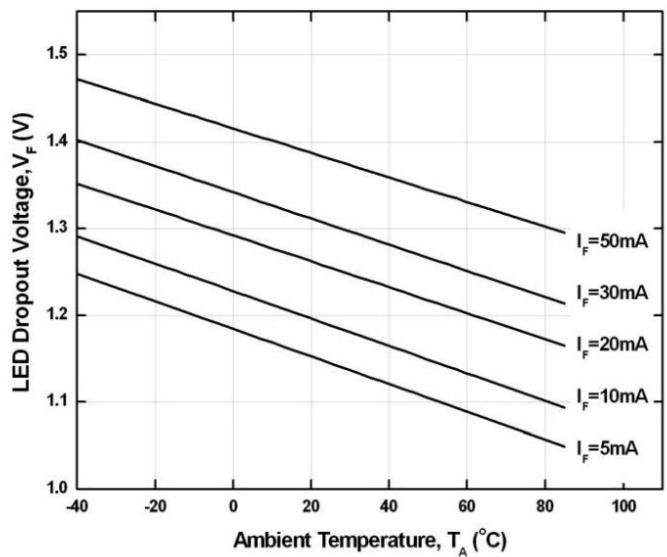


Figure 9-1. Load Voltage vs Load Current

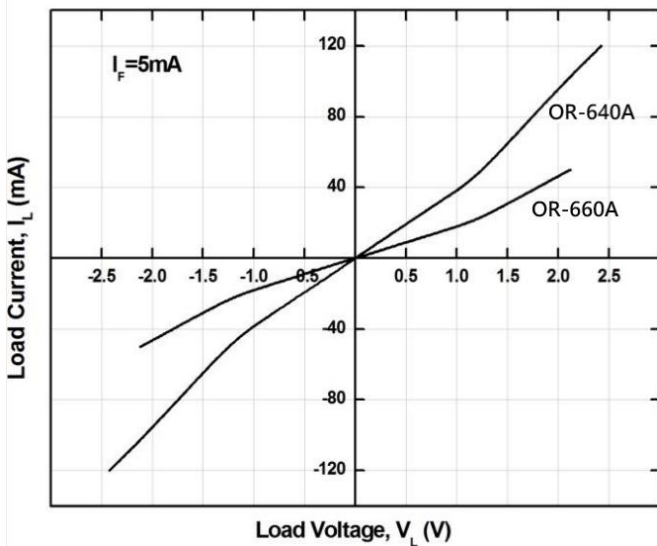


Figure 9-2. Load Voltage vs Load Current

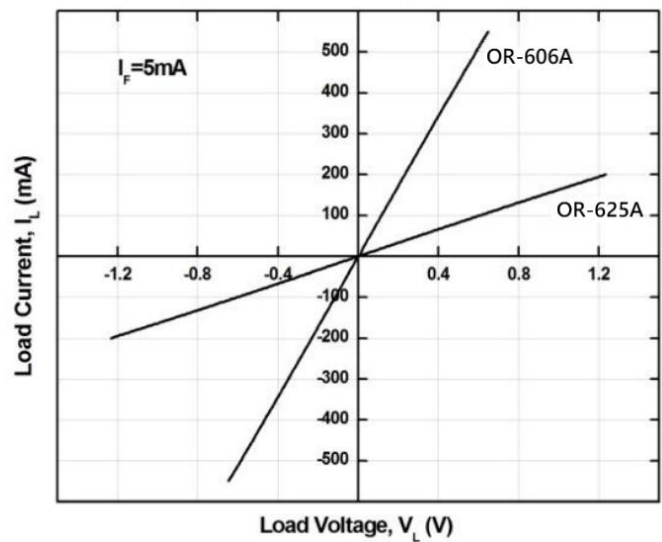


Figure 10. Off State Leakage Current vs Load Voltage

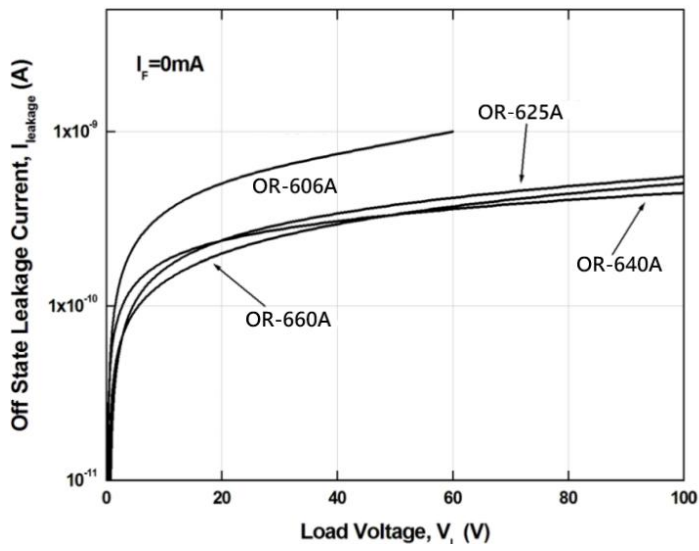


Figure 11. Applied Voltage VS Output Capacitance

